





# FM 3-30

WAR DEPARTMENT FIELD MANUAL

CHEMICAL WARFARE SERVICE

## CHEMICAL PROCESSING COMPANY

(THEATER OF OPERATIONS)

ARMY  
MEDICAL

UNCLASSIFIED

**RESTRICTED DISSEMINATION OF RESTRICTED MATTER.** The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 18b, AR 380-5, 28 Sep 1942.)


WAR DEPARTMENT : 2 MARCH 1944



CHEMICAL WARFARE SERVICE

# CHEMICAL PROCESSING COMPANY

(THEATER OF OPERATIONS)

CLASSIFICATION CHANGED  
TO **UNCLASSIFIED**  
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SECURITY OFFICER  
*Frank B. Rogers*

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FM 3-30, Chemical Warfare Service Field Manual, Chemical Processing Company (Theater of Operations) is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,  
The Adjutant General.*

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(For explanation of symbols see FM 21-6.)

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# CHAPTER 1

## GENERAL

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**1. PURPOSE.** This manual is intended as a guide to chemical processing companies (theater of operations) in the performance of their assigned missions. Procedures in this manual apply also to processing elements of chemical composite companies.

**2. SCOPE.** The contents include organization and employment of the chemical processing company (theater of operations), based on published doctrines of the War Department and experience in the operation of clothing impregnating plants. Technical Manuals and manufacturers' operating instructions provide detailed technical information on the plants. These manuals and operating instructions are supplementary to this manual. Other publications of importance to chemical processing companies are listed in the appendix.

**3. MISSIONS. a.** The primary mission of the chemical processing company is the chemical maintenance of permeable protective clothing by impregnation and reimpregnation when required.

**b.** Secondary missions include any other work detailed by the theater chemical officer or other properly designated

authority. Possible uses, other than impregnation, to which the plants may be adapted include dry-cleaning, laundering, waterproofing, dyeing, decontamination, fire-proofing, mildewproofing, mothproofing, treatment with insect repellents, delousing, and sterilizing. Additional training, changes in the equipment, and reorganization of duties within the company may be needed to accomplish these secondary missions.

**4. DEFINITIONS. a. Processing.** As used in the operations of the company, processing is the treatment of clothing or equipment, using, generally, all or part of the equipment of clothing impregnating plants. It can also include laundering, dry-cleaning, dyeing, and the other processes listed in paragraph 3b, in addition to the process of impregnation.

**b. Impregnation.** Impregnation is the process of treating clothing to make it resistant to the action of vapors and very small drops of blister gases such as H (mustard gas) and L (lewisite). Impregnation may be accomplished either by using large, mass-production equipment, such as the chemical processing company's plants, or by employing portable field-impregnating sets.

**5. CAPABILITIES. a.** Chemical processing companies (theater of operations) are separate companies but may be attached or assigned to other units.

**b.** The company possesses sufficient transportation to carry supplies for operation but does not have organic transportation for moving the heavy plant equipment. (See par. 11.) Trucks capable of carrying 6 or more tons are required for the latter and must be obtained from motor pools.

**c.** The company has small arms for its own defense against air or ground attack, but it is a service unit, not a combat unit. (See pars. 12 and 58.)

**d.** Two clothing impregnating plants are furnished each company. Using both plants on a 24-hour-per-day basis, a company can impregnate between 6,000 and 10,000 pounds of clothing a day. This is equivalent to approximately 1,000 to 1,660 uniforms a day, each uniform consisting of a pair of long cotton drawers, a long-sleeved undershirt, a hood, a one-piece herringbone twill suit (coveralls), a pair of socks, a pair of canvas leggings, and a pair of cotton gloves.

**6. ASSIGNMENT.** The companies are assigned to theaters of operations. They operate under the supervision of the theater chemical officer. A sufficient number of companies is assigned to a theater to meet impregnating requirements.

**7. LOCATION. a. Zone.** Chemical processing companies (theater of operations) normally perform their missions in the communications zone.

**b. Requirements for sites.** In addition to technical requirements for individual types of impregnating plants, there are tactical requirements, as follows:

- (1) Location on good lines of communication as close as practicable to quartermaster depots and laundries and to a chemical depot.
- (2) Good roads from railhead or navigation head to the plant sites. The roads should be able to support vehicles carrying individual loads of 6 tons of machinery.
- (3) Cover and concealment from enemy observation.
- (4) Ample water supply of the proper degree of purity for operation and maintenance of the plants, and for the use of personnel.

**c. Relative positions of plants and other company facilities.**

- (1) Each of the two plant areas of the company includes an impregnating plant (with laboratory and generator room); loading, unloading, and storage areas; water-pipe lines;

adjacent sanitary facilities; and plant defense installations.

(2) To facilitate command and operation, the two plant areas of the company should be located as close as practicable to each other and to the company headquarters, mess facilities, and bivouac area.

(3) However, to preclude damage to or destruction of both plants by an enemy air attack, it is desirable that the plants be separated by a distance of approximately 500 yards. For the protection of personnel, it is recommended that mess facilities and the bivouac area should not be located on a line between the plants.

(4) If the solvent process of impregnation is used, bivouac and mess areas of the company, and all installations occupied by the personnel of other units, should be at least 200 yards from either plant area, on higher ground, and away from all traces of the solvent odor, regardless of wind direction.

(5) See FM 21-10 for general information on the choice of a camp site and on sanitation.

**d. Structures.** Suitable existing buildings should be utilized if practicable. If there are no such buildings available, adequate buildings should be erected. The plants and most supplies require protection from the weather.

**8. ASSISTANCE BY ENGINEERS.** Functions of engineer units in theaters of operations may include the following available to the chemical processing company:

**a.** Construction and repair of roads.

**b.** Water supply and waste disposal.

**c.** Procurement, allocation, construction, and repair and maintenance of buildings.

**d.** Supplying of artificial camouflage material; supervision and inspection of camouflage installations.

## CHAPTER 2

# ORGANIZATION

**9. COMPANY.** The chemical processing company (theater of operations) is organized as shown in figure 1. For composition see T/O 3-77. The company consists of a headquarters and two operating platoons.

**a. Company headquarters.** Company headquarters is made up of an administrative and of an operating group as shown in figure 2. Duties of company headquarters personnel are described in section II, chapter 5.

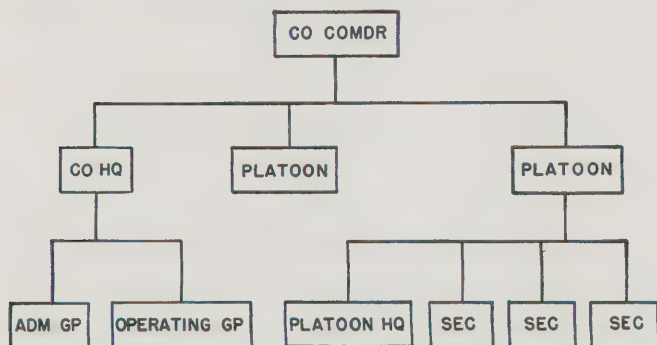


Figure 1. Organization of chemical processing company (based on T/O 3-77, 17 Dec. 42).

**b. Platoons.** (1) The two platoons are identical in organization, each being charged with the operation of a plant. A platoon includes a headquarters and three sections. The platoon headquarters includes administrative and technical personnel. Duties of platoon headquarters personnel are described in section III, chapter 5. Duties of personnel in sections are given in section IV, chapter 5. (2) The three sections provide shifts for continuous operation of the plant. A shift, as used in this manual, is the personnel required to operate and maintain a plant during a specified period of a day. It includes a section plus other personnel designated by the company commander.

## CHAPTER 3

### EQUIPMENT

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**10. IMPREGNATING PLANTS.** **a.** The basic equipment for operations of the company consists of two clothing impregnating plants. In any particular company, both plants will generally be either the M1 or M2 and of the same type or design, to facilitate interchange of spare parts, materials, and data.

**b.** Each plant is assigned to a platoon, therefore, the platoon is responsible for its assembly, operation, maintenance, repair, disassembly, packing, and destruction in case capture by the enemy is imminent. The serial number, found on the machines, should be used to identify a plant when referring to it.

**c.** Impregnating plants are designed to be operated indoors. Exposure to adverse weather can damage the plants, the chemicals, and the clothing. The plants and processes are described in section I, chapter 5.

**11. MOTOR TRANSPORT.** The company possesses vehicles and motor transport equipment for carrying personnel and supplies. Company headquarters and each platoon should be assigned one of the 2½-ton cargo trucks. However, vehicles capable of carrying 6 tons or more are

necessary for hauling each of the larger plant machines. These may be provided from a motor pool when it is necessary to move the plant or any of the machines too heavy for the company's organic vehicles.

**12. WEAPONS.** Individual weapons include carbines, rifles, and submachine guns. Organizational weapons include .50 caliber machine guns, antitank rocket launchers, and grenade launchers for defense against air and mechanized attack.

**13. OTHER EQUIPMENT.** Additional chemical, ordnance, engineer, medical, quartermaster, and signal equipment are provided, as listed in T/E 3-77.

## CHAPTER 4

### TRAINING

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#### **14. ENLISTED PERSONNEL QUALIFICATIONS.**

The personnel of a chemical processing company includes many specialists required for operation and maintenance of the impregnating plants. AR 615-26 describes the qualifications of these specialists. Their duties at the impregnating plants are stated in chapter 5.

**15. UNIT AND REPLACEMENT TRAINING.** Personnel are first trained at unit and replacement training centers as prescribed in the Chemical Warfare Service Mobilization Training Programs (MTP).

**16. COMPANY TRAINING.** Training must by no means cease after a unit or an individual replacement leaves the training center. Impregnating equipment and processes are intricate. The techniques are learned slowly, by experience and study. Plant emergencies may occur at any time of the day or night and personnel of the shift on duty must know how to act promptly with available resources. Technical books and manuals should be at hand. (See app.) Each member of the company should learn by experience the jobs of those around him and understudy the work of those over him. In this way gaps can be filled quickly and oppor-

tunities created for advancement. Operation of the plants during blackouts should be perfected. Frequent drills should be held to obtain instantaneous and correct reactions to gas, air-raid, and ground-attack alarms. If possible, target practice should be held with individual and organizational weapons.

# CHAPTER 5

## FIELD OPERATION

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### Section I Impregnating Processes

#### 17. TYPES OF IMPREGNATING PROCESSES.

Two processes are used for impregnating clothing:

**a. Solvent.** (1) The solvent process employs clothing impregnating plant, M1 (theater of operations).

(2) A solvent, acetylene tetrachloride, is used to hold the active protective agent and the binder in solution until the latter two materials have been deposited in the clothing.

(3) The solvent is toxic and precautions must be taken during the impregnating process; gas masks with service canisters and special PVA impermeable gloves are worn when needed.

(4) Clothing impregnated by this method often may be washed several times before requiring reimpregnation. Shrinkage as a result of impregnation by the solvent process is less than that caused by the suspension process.

**b. Suspension.** (1) The suspension method employs clothing impregnating plant, M2 (theater of operations).

(2) Water is used in place of the acetylene tetrachloride. The water holds the active protective agent and other chemicals in suspension until they have been deposited in the clothing.

(3) This process has the advantage of nontoxicity to plant operating personnel; the equipment is somewhat simpler and less difficult to maintain; the use of water instead of acetylene tetrachloride eliminates a supply problem.

(4) However, proper suspensions are difficult to prepare; shrinkage of clothing may be considerable, especially of woolen garments; dyes must be added to the suspensions to obliterate white streaks which would otherwise appear; and the clothing does not withstand laundering as well as that treated by the solvent process.

**18. OPERATING RECORDS.** It is essential that accurate and complete records be kept of weights and quantities of materials, and of the time consumed during every step of each run of clothing. A primary duty of each operator is to keep such records. Section leaders and platoon sergeants check and study these reports. Records must also be kept by maintenance and laboratory personnel on the details of their work. Records are submitted through platoon channels to company headquarters. They provide much valuable information with which to improve production.

**19. PREPARING CLOTHING. a.** All garments in a run must be of similar fabric. Herringbone twill garments, for example, should not be impregnated in the same run as undershirts. When practicable, garments of only one size should be included in each run.

**b.** When clothing is removed from packages and bundles, the containers are set aside for reuse.

**c.** Tags, pins, and other nontreatable parts of clothing are removed.

**d.** Samples of the clothing, 5 inches square, are cut out of representative garments and attached to other garments in the run. (After processing, the samples are tested at the plant laboratory for content of protective agent.)

**e.** The clothing is weighed into correct loads for the machines.

## **20. PREPARING SOLUTION OR SUSPENSION.**

The impregnating solution or suspension is prepared in special tanks, each of which has a capacity of several hundred gallons. The M1 plant has two tanks; the M2 plant has five. The various impregnating materials are placed in the tanks in the proper proportions. They are warmed, mixed, stored, and pumped into the impregnator when needed.

**21. PREDRYING. a.** The M2 plant does not include or require a predryer.

**b.** Clothing to be processed in an M1 plant must be dried in a predryer. This will be done even when the clothing seems "bone dry" because traces of moisture cause decomposition of the impregnating solution, with consequent damage to the garments and to the plant.

**c.** The predryer is essentially a perforated metal drum rotating within a housing. The clothing in the drum is tumbled while a current of heated air blows through it. Part of the heated air is recirculated and part is expelled. After the clothing is predried, it is removed from the predryer and transferred to the adjacent impregnator.

## **22. IMPREGNATING AND CENTRIFUGING. a.**

At the impregnator, the clothing is tumbled and soaked in the impregnating solution or in the suspension.

**b.** The impregnator, like the predryer, is essentially a perforated metal drum rotating within a housing. Pipe

lines lead to it from the solution tanks or from the suspension tanks.

**c.** After the clothing is saturated, the excess solution or suspension is drained from the impregnator to the tanks.

**d.** The clothing is then centrifuged (tumbled at high speed) in the impregnator to throw off additional solution or suspension.

**23. DRYING, OR FINAL DRYING.** **a.** After clothing is impregnated and centrifuged, it is dried to eliminate the remaining solvent or water. This step is known as "drying" at M2 plants, and as "final drying" at M1 plants.

**b.** Two large machines are used for drying in each type of plant and are known respectively as "dryers" or "final dryers." These are similar in construction to the pre-dryer. Final dryers of M1 plants include a solvent-recovery apparatus which salvages the condensed solvent for reuse in preparing solutions.

**24. FOLDING AND BUNDLING.** The clothes are then inspected, weighed, allowed to cool, folded, tied in bundles with cord, placed in shipping containers (if possible in the original packages), and tagged for the quartermaster. Garments of the same type and size should be bundled together.

**25. LABORATORY TESTS.** Laboratory personnel of the company test samples of the impregnating solution or of the suspension, and samples of clothing. This is done at the chemical laboratory which is an integral part of each plant.

**26. GENERATORS.** Steam and electric generators are provided and are operated by specially trained personnel. The generators provide sufficient steam for processing and for plant heating, and sufficient electricity for operating the machinery and lighting the plant areas.

**27. MAINTENANCE AND REPAIR.** The company includes skilled maintenance personnel equipped with tools and spare parts sufficient to cope with almost any maintenance or repair problems. Repairs beyond the capacity of assigned personnel and equipment should be referred promptly to a chemical maintenance company if one is within easy access. If a chemical maintenance company cannot give the necessary assistance, the cooperation of maintenance personnel of other services or arms may be obtained. Local commercial repair sources may be utilized in an emergency. If the trouble is of major importance and if it is doubtful that repairs can be effected quickly, the theater chemical officer should be notified promptly so that experts and equipment, if available, can be provided.

## Section II

### Duties of Personnel, Company Headquarters

**28. COMPANY COMMANDER.** The company commander is responsible for the operation, administration, discipline, security, and training of the company. He prepares the written standing operating procedure for the company. He makes necessary contacts with other service units.

**29. OTHER COMPANY OFFICERS.** The other company officers are assigned as platoon leaders and assistant platoon leaders by the company commander. They also assist him in the administration of the company by performing the duties of executive officer, plans and training officer, supply and transportation officer, and mess officer. Information on these duties will be found in FM 25-10, TM 10-205, 12-250, and 12-255.

**30. ADMINISTRATIVE GROUP.** Personnel of the administrative group include a first sergeant, a unit supply sergeant, a mess sergeant, cooks, cook's helpers, a company clerk, a chauffeur, and an orderly. They perform the usual prescribed duties of their classifications as stated in the manuals referred to in paragraph 29, and in TM 10-460. In addition to regular duties, the mess sergeant and the company clerk each drives one of the trucks, as prescribed in T/O 3-77.

**31. OPERATING GROUP.** Personnel of the operating group of company headquarters include the superintendent (102), the operating supply sergeant (374), and the operating supply clerk (374). Their duties are described in paragraphs 32, 33, and 34.

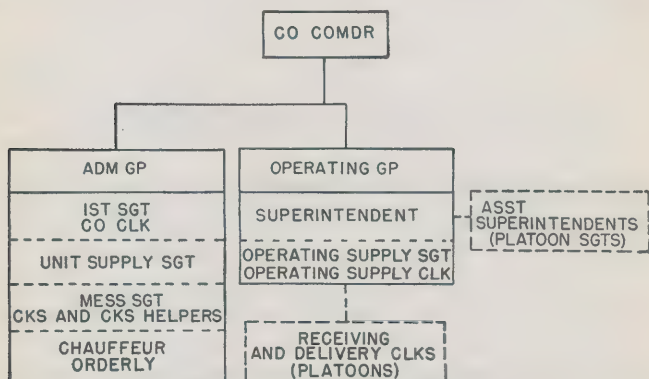


Figure 2. Organization of company headquarters, chemical processing company (based on T/O 3-77, 17 Dec. 42).

**32. SUPERINTENDENT (102) a.** Advises the company commander regarding the efficient and safe operation of the impregnating plants.

**b.** Inspects and exercises technical supervision over all plant activities, including assembly and installation of

equipment, supply, operation, maintenance, repair, safety measures, storage, transportation, and disassembly.

**c.** Studies all report forms from the plants and makes appropriate graphs, charts, and recommendations for changes.

**d.** Keeps all plant reports and records in a permanent file at company headquarters.

**e.** Studies all phases of plant activities and initiates improvements that will increase production, save materials, preserve equipment, or increase safety.

**f.** Distributes work equitably between the two plants, taking into consideration any necessary shut-downs for repair or maintenance.

**g.** Schedules work at plants well in advance of operations.

**33. OPERATING SUPPLY SERGEANT (374).** This sergeant, who is responsible to the supply officer.—

**a.** Supervises and directs subordinates in the requisitioning, receipt, transport, storage, and issue of supplies, tools, and spare parts used in the operation, maintenance, assembly, and disassembly of the impregnating plants. (Other equipment and supplies are handled by the unit supply sergeant.)

**b.** Controls the amount of stock on hand by supervising the keeping of perpetual inventories and the taking of periodical physical inventories.

**c.** Anticipates and prevents stock depletions by estimating, from plant records and inventories, the required amounts for future use.

**d.** Maintains prescribed records indicating status or disposition of expendable or nonexpendable impregnating plant equipment, supplies, tools, and spare parts.

**e.** Checks impregnating plant materials received and inspects them for defects, rejecting imperfect or incorrect items or lots.

f. Makes frequent inspections of all operating supplies in storage within the plant areas.

**34. OPERATING SUPPLY CLERK (374).** This clerk assists the operating supply sergeant in the duties described in paragraph 33. He also drives a truck as prescribed in T/O 3-77.

## Section III

### Duties of Personnel, Platoon Headquarters

**35. PLATOON LEADER.** Each platoon is commanded by an officer who is responsible for the operations, training, discipline, and security of the platoon, and the operation, care, and maintenance of the platoon's plant and plant area. He and the assistant platoon leader alternate on duty at the plant whenever it is being operated, repaired, assembled, or disassembled, except when relieved by the company commander. He directs the operations and inspects the plant and records of the platoon. In addition, the platoon leader performs one or more company duties listed in paragraph 29.

**36. ASSISTANT PLATOON LEADER.** The leader of each platoon is aided by an assistant, who is an officer. The two platoon officers alternate on duty at the plant. (See par. 35.) During the absence of the platoon leader and when the assistant platoon leader is on duty at the plant, the assistant will have the same authority and responsibilities as the platoon leader. The assistant platoon leader also performs one or more company duties, listed in paragraph 29.

**37. PLATOON SERGEANT (ASSISTANT SUPER-INTENDENT (102)). a.** Supervises technical operations and activities at the plant and in the plant area of the

platoon to which he is assigned, under the direction of the platoon leader and the assistant platoon leader. (See fig. 3.)

**b.** Consults with the superintendent on all important technical matters.

**c.** Receives all reports and records each day from the section leaders and the maintenance foreman of the plant.

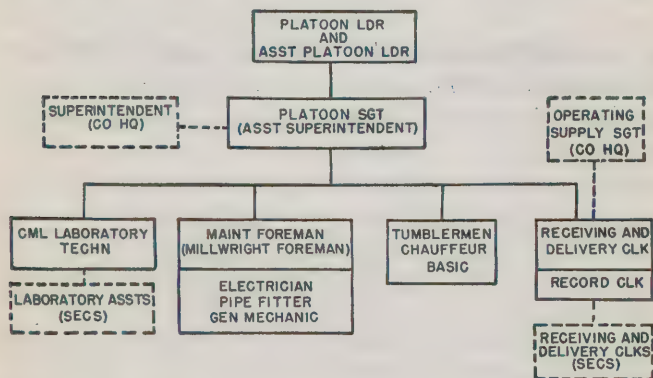


Figure 3. Organization of platoon headquarters, chemical processing company (based on T/O 3-77, 17 Dec. 42).

**d.** Studies all reports and records with a view to increasing production, saving materials, preserving equipment, and promoting safety. When major changes are conceived, recommendations should be made to the platoon leader and superintendent. (Minor changes may be put into effect on the platoon sergeant's initiative; such changes should be reported to the platoon leader.)

**e.** Delivers reports to the platoon leader after studying them and making any necessary corrections.

**f.** Schedules operations well in advance so as to make most efficient use of platoon personnel and plant equipment.

**g.** Distributes work equitably among the shifts.

**h.** Inspects the plant completely at least once a day, bringing inefficiencies to the attention of the section leaders (or the maintenance foreman in case of mechanical or electrical defects); inspects each of the shifts at varying times.

**i.** Reports inefficiencies of a serious or recurring nature to the platoon leader.

**j.** Performs all the customary duties of a platoon sergeant.

**38. MAINTENANCE FOREMAN (MILLWRIGHT FOREMAN) (127).** **a.** Supervises all lubrication, maintenance, and repair work in the plant and plant area to which his platoon is assigned.

**b.** Oversees the work of the electrician, pipe fitter, general mechanic, and other personnel assigned to maintenance work.

**c.** Supervises the moving and installation of plant machinery.

**d.** Seeks means of increasing the physical operating efficiency of the plant.

**e.** Assists the platoon sergeant in planning shut-downs of plant for necessary repair or maintenance work which requires cessation of operations.

**f.** Studies daily maintenance reports (check lists) and passes them on each day to the platoon sergeant.

**g.** Relieves and assists the electrician, pipe fitter, and general mechanic when necessary.

**39. CHEMICAL LABORATORY TECHNICIAN (411).** **a.** Advises the laboratory assistants on technical matters.

**b.** Sees that proper records of all tests are kept.

**c.** Checks laboratory supplies and reports their status to the operating supply sergeant.

**d.** Inspects the laboratory for cleanliness and order.

e. Operates the laboratory when acting as necessary relief for the laboratory assistants.

f. Supervises the filing of samples of tested clothing. (These are fastened to identifying tags or labels.)

g. Advises and assists in maintaining and preparing the impregnating solutions, or suspensions.

**40. RECEIVING AND DELIVERY CLERK (PLATOON) (186).** a. Keeps a perpetual inventory record of incoming and outgoing clothing.

b. Keeps separate perpetual inventory records of tools and operating supplies, such as chemicals, fuel, and spare parts.

c. Controls the issuing of all plant operating supplies and tools.

d. Keeps all stores in a convenient, dry, safe, and camouflaged location.

e. Makes a frequent inspection of supplies to see that they are adequate.

f. Notifies the operating supply sergeant when supplies are needed *before* shortages develop.

g. Keeps first aid kit in a conspicuous, central location at all times.

**41. ELECTRICIAN (078).** a. Makes, inspects, and maintains all electrical installations.

b. Assists the maintenance foreman in any other maintenance or repair work.

c. Performs assigned duty on a regular shift.

**42. PIPE FITTER (162).** a. Installs, inspects, paints, and maintains all piping.

b. Assists the maintenance foreman in any other maintenance or repair work.

c. Performs assigned duty on a regular shift.

**43. GENERAL MECHANIC (121).** a. Keeps plant machinery and equipment in good repair and working order.

b. Lubricates the plant machinery and equipment accord-

ing to a maintenance check list; fills in, initials, and submits the check list each day to the maintenance foreman.

**c.** Inspects the plant machinery and equipment daily for mechanical defects and excessive wear. (He immediately reports any defects to the maintenance foreman. In the absence of the latter he reports them to the section leader.)

**d.** Maintains tools.

**e.** Assists the maintenance foreman in any other maintenance or repair work.

**f.** Performs assigned duty on a regular shift.

**44. RECORD CLERK (323).** The record clerk assists the platoon receiving and delivery clerk.

**45. CHAUFFEUR (345).** The chauffeur of each platoon has the usual duties of this classification.

**46. TUMBLERMEN (103) AND BASIC (521).** The six tumblers and the one basic in platoon headquarters (as distinguished from those in the sections) are assigned duties by the platoon sergeant.

## Section IV

### Duties of Personnel, Section

**47. SECTION LEADER (PROCESSING FOREMAN (502)).** **a.** Supervises operations of the section to which he is assigned. (See fig. 4.)

**b.** Inspects all members of the shift before they go on duty at the plant; reports all absentees; returns to quarters any members of the shift who are not in proper condition to do their work, reporting the names and reasons for his action to the first sergeant; accepts as substitutes only those qualified for the work.

**c.** Checks all machines and records with the leader of the section going on or off duty.

- d. Has repairs made promptly.
- e. Checks all records during operation to determine that production, plant maintenance, and laboratory tests are proceeding properly.
- f. Sees that production schedule for his shift is met.
- g. Is responsible for the military conduct of his shift.
- h. Releases shift at the end of a 15-minute overlap period, when both shifts are present at the plant. (During the overlap, the two section leaders check production, maintenance, and laboratory reports, and the equipment.)
- i. Signs production and laboratory reports and submits them to the platoon sergeant.

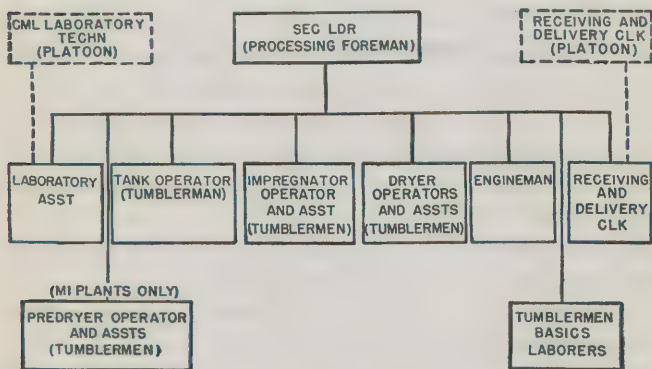


Figure 4. Organization of section, chemical processing company (based on T/O 3-77, 17 Dec. 42).

j. Sees that correct quantities and concentrations of suspensions or of solutions are used.

k. Requires that all safety precautions be observed.

**48. ENGINEMAN (ENGINEMAN, STATIONARY, STEAM (082).** a. Keeps the steam and electric generators operating properly.

b. Reports all break-downs immediately to section leaders or maintenance foreman.

c. Makes at least one complete inspection of the generators during each shift.

d. Keeps a record of generator fuel consumption.

e. Checks fuel tank levels at frequent intervals.

f. Keeps the section receiving and delivery clerk advised on fuel, boiler water, and spare parts requirements.

g. Checks the steam and water lines for leaks several times during each shift. (If any leaks are found, he initiates repair measures.)

h. Makes sure that boiler and condensate tanks contain the correct quantities of water.

i. Cooperates closely with the maintenance foreman and other maintenance personnel.

**49. LABORATORY ASSISTANT (411).** a. Makes all tests according to prescribed procedures.

b. Notifies the section leader of the results of the tests as soon as they are completed.

c. Keeps records of all tests and submits them to the section leader.

d. Advises and assists in maintaining and preparing the impregnating solutions or suspensions.

e. Keeps the laboratory and equipment clean, orderly, and in good repair.

f. Notifies the section receiving and delivery clerk of the laboratory supply and equipment requirements before they are needed.

**50. RECEIVING AND DELIVERY CLERK (186).**

the receiving and delivery clerk in each section functions during an assigned shift and assists the platoon receiving and delivery clerk in his duties (see par. 40).

**51. IMPREGNATOR OPERATOR (TUMBLER-MAN (103)).** a. In a suspension process plant—

(1) Obtains clothing from the receiving and delivery clerk.

- (2) Inspects clothing to see that it is of the proper type and is prepared for impregnation; rejects unsuitable articles.
- (3) Weighs clothing into batches of the proper sizes for impregnation.

**b.** In both types of plants—

- (1) Checks loading of the impregnator and closing of the doors, being careful that no clothing falls between the cylinder and the housing.
- (2) Makes sure that the suspension, or solution is properly pumped in and out of the machine and that centrifuging is done in the prescribed manner.
- (3) Observes correct operating time limits.
- (4) Keeps accurate time and weight records.
- (5) Sees that the machine is properly maintained.
- (6) Reports immediately to the section leader all breakdowns or suspected mechanical troubles.

## **52. TANK OPERATOR (TUMBLERMAN 103). a.**

Prepares and adjusts the suspensions or solution.

**b.** Checks the condition of the lines and valves before pumping (being careful not to pump against a closed valve).

**c.** Works with the impregnator operator when pumping suspension or solution.

**d.** Inspects all suspension or solution tanks, motors, pumps, and piping several times during each shift, and immediately reports all weaknesses or defects to the section leader.

**e.** Sees that suspensions or solutions are properly agitated and are maintained at the correct levels.

**f.** Keeps solution at proper temperature (in a solvent-processed plant).

**g.** Sees that the equipment is properly maintained.

**h.** Keeps proper records of the suspensions or solutions.

## **53. DRYER OPERATORS (TUMBLERMEN 103). a.**

In a solvent-process plant, if operating the predryer—

- (1) Obtain clothing from the receiving and delivery clerk.
- (2) Inspect clothing to see that it is of the proper type and is prepared for impregnation; reject unsuitable articles.
- (3) Weigh clothing into batches of the proper sizes for impregnation.

**b.** In both types of plants—

- (1) Check loading of the dryers and closing of the doors, being careful that no clothing falls between the cylinder and the housing.
- (2) Observe correct operating time limits and temperatures.
- (3) Keep accurate time and weight records.
- (4) See that the machines are properly maintained.
- (5) Report immediately to the section leader all breakdowns or suspected mechanical troubles.

**54. ASSISTANT IMPREGNATOR AND DRYER OPERATORS (TUMBLERMEN 103).** The assistant operators help and understudy the operators. They also fold, pack, and unpack clothing, or perform other work when ordered.

**55. BASICS (521) AND LABORERS (590). a.** Open packages of clothing to be impregnated.

**b.** Fold and pack clothing after impregnation, first removing damaged garments.

**c.** Assist in loading and unloading trucks.

**d.** Learn the duties and techniques of other plant personnel to qualify as replacements.

**e.** Help on repair and maintenance work.

**f.** Clean the equipment, police the plant area, act as runners, and perform any other work designated by the section leader.

## CHAPTER 6

### SECURITY

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**56. GENERAL. a.** The company commander is responsible for the local security of his company.

**b.** Equipment is provided in accordance with T/E 3-77.

**c.** Care must be taken to conceal the installations from enemy observation and not to disclose them by unnecessary movement or indiscriminate firing.

**57. CONCEALMENT AND COVER. a. Vulnerability of plants.** Impregnating plants and supplies are extremely vulnerable to enemy action. Clothing, fuel, and chemicals are readily ignited. Small-arms projectiles of the smallest caliber or bomb fragments will pierce the machinery and the supply containers. Holes from projectiles are very difficult if not impossible to repair and can put the machinery out of action for some time if not permanently. Replacements of machines are not made quickly in the theaters of operations.

**b. Need for camouflage.** The art of camouflage must be used with skill and understanding because the plants not only are vulnerable but also are large, virtually semi-permanent, and can give off smoke and steam.



*Figure 5. Clothing impregnating plant showing concealed location and water source—general view.*



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*Figure 6. A concealed and camouflaged clothing impregnating plant.*



*Figure 7. Winter camouflage of a clothing impregnating plant.*

**c. Camouflaging.** Natural and artificial camouflage materials should be employed for immediate protection as soon as construction work is begun at the plant areas. Engineer publications such as FM 5-20 and 5-21 should be used as guides in this work. Engineer camouflage units should be asked to inspect the work and suggest improvements. Careful study from the air and nearby ground elevations will assist in detecting defects in the camouflaging. Examples of well-concealed plants are shown in figures 5 to 8, inclusive.

**d. Existing buildings and roads.** Existing buildings and good roads should be considered, whenever possible, in selecting sites for plants and supply dumps. (See par. 7.)

**e. Dispersion.** The plants should be separated from each other, from the vehicle park, and from the bivouac and mess area, as described in paragraph 7c.

**f. Vegetation and paths.** Because of the semifixed nature of the plants, great care must be exercised to prevent disturbance to vegetation and to avoid making unnecessary new paths, vehicles tracks, or roads. Continuous enemy reconnaissance probably will discover any changes.

**g. Steam.** Discharge of steam into the air is visible to air and ground observers many miles away. Photographs clearly show the source of steam clouds. Exhaust steam from condensate tanks should be kept to a minimum. It should be piped if possible into a river, lake, or other body of water. Care should be taken to prevent an appreciable water head which will cause a building up of back pressure. The boiler will be "blown off" only at night or when there is no possibility of the presence of enemy aircraft.

**h. Boiler and other smoke.** (1) Faulty boiler control can readily produce either a heavy, black, sooty smoke or a white oil-vapor fog. These must be avoided. A properly functioning oil burner discharges no smoke from the stack.

(2) Trash, wood, and brush fires can easily reveal the plants to the enemy. Trash should be hauled from the area for disposal. Wood should not be burned for cooking purposes if other fuel is available.

**i. Blackouts.** (See fig. 8.) Blackout requirements as set up by the commander of the area will be followed in detail by the processing company. The plants cannot be operated in total darkness, but little illumination is required. Ventilation is necessary, particularly in the solvent-process plants. Light-locks and fans may be needed. Luminous or white paint, or luminous paper may be used liberally to outline machinery and passageways. The laboratory must be provided with complete blackout protection, as full illumination is necessary there.

**j. Cover.** Sandbags may be stacked around the plant for protection against bomb blasts or missiles. Bomb-proof, gasproof shelters should be built as described in FM 5-15 and TM 3-350. Until the shelters are ready, slit trenches, foxholes, or other temporary cover should be provided wherever personnel work or assemble.

## **58. ACTIVE DEFENSE MEASURES. a. General.**

In addition to the necessity for concealment and cover, the company must be prepared to resist attack by aircraft, enemy ground action, or saboteurs.

**b. Guards.** Guards must be established at approaches to the plants, storage dumps, company headquarters, and bivouac or billet area. Observation posts should be manned. A constant lookout for enemy aircraft must be maintained. The extensiveness of the guard system will depend on the location of the plant, nearness of the enemy, attitude of the inhabitants, and other factors.

**c. Employment of weapons.** The .50 caliber machine guns will be mounted upon trucks or emplaced on the ground, as the situation demands. They should be posi-



*Figure 8. Closing flaps for operation of clothing impregnating plant during black-out. Opening in lower center permits entry of air into the electric generator.*

tioned so that their fire will not disclose the plant locations. In general, enemy aircraft should be engaged only when the plants are directly fired upon, bombed, or sprayed. Each section should have at least two teams trained to use the antitank rocket launchers. All personnel should be trained to use the grenade launchers.

**d. Prepared positions.** As soon as the company is established at a site, defensive positions should be prepared and personnel taught to take their stations when attack is imminent. Alternate positions should be prepared as time permits. An all around defense should be contemplated.

## **59. DEFENSE AGAINST CHEMICAL ATTACK.**

The following measures, among others (see FM 21-40 and TM 3-290), should be effected to insure protection in the event of chemical attack by the enemy:

**a.** All personnel should be thoroughly trained in the use of the gas mask, protective clothing, and other means of individual protection.

**b.** The standing operating procedure should cover the subject of chemical attack and all personnel should thoroughly understand their duties as stated therein.

**c.** Frequent gas mask drills should be held.

**d.** The detector kit will be employed by a gas noncommissioned officer as directed by the company commander.

**e.** Gas alarms should be located in a convenient place and all personnel should be familiar with their sound.

**f.** Gasproof, bombproof shelters should be built as stated in paragraph 57.

**g.** Decontamination methods should be thoroughly understood by all personnel. Materials and equipment should be procured or improvised.

**h.** Gas masks and other protective equipment should be inspected regularly, repaired with the company gas mask repair kit, and replaced if necessary. Canisters should be renewed as needed.

# CHAPTER 7

## SUPPLY

**60. SUPPLY ORGANIZATION. a. Company commander.** The responsibility for requisitions, records, and all other supply matters rests with the company commander.

**b. Supply officer.** A company supply officer is appointed by and is responsible to the company commander. Generally, he also serves as transportation officer.

**c. Supply sergeants.** As shown in figure 9, the operat-

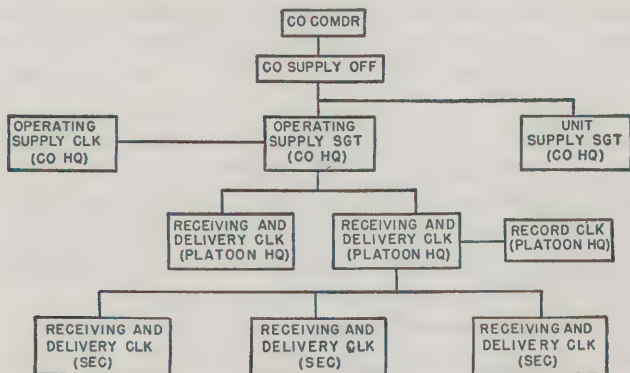


Figure 9. Supply organization, chemical processing company (based on T/O 3-77, 17 Dec. 42).

ing supply sergeant (par. 33) and the unit supply sergeant are responsible to the supply officers.

**d. Clerks.** Duties of personnel assisting the operating supply sergeant are listed in paragraphs 34, 40, 44, and 50.

**e. Helpers.** When needed, additional personnel may be detailed to assist the unit and operating supply sergeants. This personnel will usually consist of basics, laborers, tumblermen, or other enlisted personnel not required at other posts at the time.

**61. CLOTHING FOR PLANTS. a. Suitability for impregnation or reimpregnation.** Clothing, to be suitable for impregnation or reimpregnation, must be—

(1) In good condition, without tears, rips, holes, weak spots, or patches.

(2) Special or permeable protective clothing, if possible. (In an emergency, other cotton, wool, or cotton-and-wool articles of wear can be treated.)

(3) Clean, either new issue or washed by quartermaster laundry methods.

**b. Stock.** Enough suitable clothing should be on hand at the plants to assure uninterrupted operation. Lacking provision of large storage space, the company is not required to accept additional clothing beyond plant requirements.

**c. Priority.** Articles of wear most needed for the protection of troops should be treated first. Outer wear, such as herringbone-twill suits and canvas leggings, will often be required with greater urgency than will underwear. Impregnation will generally be given precedence over other types of processing, although not invariably.

**d. Quartermaster functions.** Operations of quartermaster units with which those of the chemical processing company are coordinated include—

- (1) Procurement and supply of clothing suitable for impregnation or other processing.
- (2) Use of kit, testing, impregnate, in clothing to determine whether previously treated clothing requires reimpregnation after laundering.
- (3) Receipt and inspection of clothing after impregnation or other processing.
- (4) Sizing, if necessary, of clothing after it has been treated.
- (5) Baling, if necessary, of clothing after treatment.
- (6) Receipt and disposal of rejected or spoiled clothing, samples, and clothing from which samples have been taken.
- (7) Storage and issue of treated clothing.

**62. OPERATING SUPPLIES.** Operating supplies, such as chemicals, fuel, and spare parts are requisitioned, as required, through the usual channels. Estimated requirements for a week, based on a 24-hour-day operation, should be on hand at the plants. The procedure for obtaining supplies is stated in detail in FM 3-15, 100-10, and other publications listed in the appendix. Supply personnel in the company should know at all times the status of the stock of each item. The chemical depot and other agencies involved should be kept constantly advised of the state of stocks.

**63. GAS MASK CANISTERS.** If solvent-process impregnating plants are operated, personnel handling or coming near the solvent, the solution, the tanks, the impregnator and the final dryers must frequently wear their gas masks (TM3-270). This makes it necessary that canisters be inspected often. An adequate supply of canisters should be available for replacements.

# APPENDIX

## LIST OF REFERENCES

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Chemical Warfare Mobilization Training Program for Chemical Warfare Service Units.	MTP 3-2
Chemical Warfare Mobilization Training Program for Enlisted Replacements at Chemical Warfare Replacement Training Centers.	MTP 3-3
Chemical Warfare Unit Training Program for Chemical Warfare Service Units at Chemical Warfare Unit Training Centers.	MTP 3-4
Supply and Field Service.....	FM 3-15
Communications, Construction, and Utilities.	FM 5-10
Camouflage.....	FM 5-20
Camouflage Painting of Vehicles and Equipment.	FM 5-21
Reference Data.....	FM 5-35
Field Sanitation.....	FM 8-40
Quartermaster Operations.....	FM 10-5
Quartermaster Service in Theater of Operations.....	FM 10-10
List of Publications for Training.....	FM 21-6
Equipment, Clothing, and Tent Pitching....	FM 21-15

Organization, Technical and Logistical Data.	FM 101-10
Storage and Shipment of Dangerous Chemicals.....	TM 3-250
Clothing Impregnating Plant, M1.....	TM 3-270 <sup>1</sup>
Clothing Impregnating Plant, M2.....	TM 3-280 <sup>1</sup>
Miscellaneous Gas Protective Equipment....	TM 3-290 <sup>1</sup>
Materials for Protective Concealment.....	TM 5-269
Construction in the Theater of Operations..	TM 5-280
Construction in the Theater of Operations...	TM 5-281
Water Supply and Water Purification.....	TM 5-295
Storage and Issue.....	TM 10-250
Laundries, Laundry Battalions, and Laundry Companies.	TM 10-350

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<sup>1</sup> When published.













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